

# PATENT ABSTRACTS OF JAPAN

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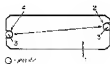
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(21)Application number : 08-133006 (71)Applicant : NEC KANSAI LTD

(22)Date of filing : 28.05.1996 (72)Inventor : TANASE RYOICHI

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(54) PRINTED CIRCUIT BOARD



(57)Abstract:

**PROBLEM TO BE SOLVED:** To align a printed circuit board accurately at the time of inspection and adjustment by making a notch in the end face at the circumferential part of an insulating board and fitting an aligning guide pin freely in the notch as an alignment reference part for inspecting and adjusting the electrical characteristics.

**SOLUTION:** An alignment reference part 2 is provided on the longitudinal end face of a printed circuit board 1, and an aligning guide pin 3 is inserted into the

notch at the time of inspection and adjustment thus aligning the printed circuit board. The alignment reference part 2 is required for the printed circuit board 1 at more than one point. In order to enhance the alignment accuracy, the alignment reference parts are spaced apart from each other as much as possible. According to the arrangement, the printed circuit board can be aligned accurately at the time of inspection and adjustment while reducing the size and the cost thereof.

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## LEGAL STATUS

[Date of request for examination]

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registration]

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## CLAIMS

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### [Claim(s)]

[Claim 1] The printed circuit board which formed notching in the periphery end face of an insulating substrate, enabled wearing of the guide pin for positioning of, and was made into the alignment criteria section for an electric characteristic inspection and adjustment at this notching.

[Claim 2] The printed circuit board according to claim 1 characterized by for said insulating substrate consisting of the body and the subsection, and forming said alignment criteria section in the disengageable subsection from the body.

[Claim 3] The printed circuit board which prepared the through hole which connects electrically the electrical circuit on said body, and the flow pattern for aging on said subsection between said bodies and said subsections, divided after aging termination in this through hole, and was made into the alignment criteria section.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the technique for carrying out alignment of the printed circuit board to accuracy at the time of an electric characteristic inspection (henceforth \*\*\*\*), and adjustment.

[0002]

[Description of the Prior Art] When electronic parts are carried in a printed circuit board and it forms an electrical circuit, \*\*\*\* and adjustment are made in the production process for quality control of an electrical circuit, and electrical-characteristics reservation. For this reason, it is required for the part for measurement of the electrical circuit on a printed circuit board to contact a test terminal to accuracy from the exterior. Although \*\*\*\* is performed with an automation line, a printed circuit board carries out automatic positioning of the printed circuit board which flows a line top here at the equipment for \*\*\*\*, descends or raises a test terminal from the upper part of a substrate thru/or a lower part, and makes a test terminal contact a predetermined test pad or the predetermined location of components generally.

[0003] Although the cutting plane of a V cut will generally be used when performing alignment of a printed circuit board conventionally using the end face (straight-line part) of a substrate in order to contact a test terminal in the specific part of a substrate, an about \*\*0.2mm error is not avoided according to a gap of the location of a V cut slot, and generating of weld flash. Therefore, it was difficult to perform exact alignment. Moreover, when more exact alignment is the need, as shown in drawing 6, the circular location hole 20 was established in the printed circuit board 10, and the method of performing alignment of a printed

circuit board 10 has so far been taken by letting the guide pin 30 by the side of a fixture pass to the location hole 20.

[0004]

[Problem(s) to be Solved by the Invention] However, in the inverter for liquid crystal back light burning etc., all possible [ a printed circuit board ] miniaturizations are required, and exact alignment is required also compared with the former for the miniaturization of high density assembly and components. However, if it is impossible to form the alignment location hole of the substrate used in the case of \*\*\*\* into the printed circuit board by which high density assembly was carried out and this location hole is formed near the edge of a printed circuit board, in order for the mechanical strength by the side of a substrate end face to fall, and for the problem that that part is missing to arise and to avoid this, sufficient distance needed to be maintained from the edge of a printed circuit board, and it had become the factor which bars the miniaturization of a substrate. This invention is in view of such a situation to offer the printed circuit board which can perform alignment of a printed circuit board to accuracy at the time of \*\*\*\* and adjustment.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention forms notching in the periphery end face of an insulating substrate, and offers the printed circuit board which enabled wearing of the guide pin for positioning of, and was made into the alignment criteria section for an electric characteristic inspection and adjustment at this notching. Moreover, said insulating substrate consists of the body and the subsection, and the printed circuit board by which said alignment criteria section is formed in the disengageable subsection from the body is offered. Moreover, the through hole which connects electrically the electrical circuit on said body and the flow pattern for aging on said subsection is prepared between said bodies and said subsections, it divides after aging termination in this through hole, and the printed circuit board made into the alignment criteria section is offered.

[0006]

[Embodiment of the Invention] Hereafter, this invention is explained with reference to a drawing. Drawing 1 is the printed circuit board 1 of this invention, it has the criteria section 2 for alignment in the end face of the longitudinal direction of this printed circuit board 1, inserts the guide pin 3 for alignment at this alignment criteria section 2 at the time of \*\*\*\* and adjustment, and performs alignment of a printed circuit board. This criteria section 2 for alignment is the two or more place need at a printed circuit board 1. In order to raise alignment precision, the criteria section for alignment is good to arrange so that each other as possible distance may separate.

[0007] Moreover, as the printed circuit board 1 at the time of \*\*\*\* and adjustment shows drawing 2 (a), in order to prevent being installed accidentally, it is made for the configuration of the printed-circuit-board 1 whole not to become point symmetry and axial symmetry to the alignment criteria section 2, as shown in drawing 2 (b). Although the dead space of a printed circuit board 1 decreases and a printed circuit board can be miniaturized so that the diameter of the alignment guide pin 3 is thin, for a certain reason, the diameter of 1.7mm or more is required also for the problem of the endurance of a guide pin 3 at the case where a raw material is iron.

[0008] Drawing 3 is the printed circuit board of structure with the alignment substrate 4 which the criteria section 2 for alignment can detach from printed-circuit-board 1 body. It cuts in the division section of the perforation on D-D line at the time of \*\*\*\* and adjustment, and alignment of a printed circuit board 1 is performed using the criteria section 2 for alignment on D-D line of a printed circuit board, and after \*\*\*\* and adjustment termination cuts the division section of the V cut slot on an E-E line, and forms a printed circuit board 1. This printed circuit board 1 serves as a product. A dead space is not contained in the printed circuit board 1 produced commercially, but the demand of a miniaturization can be filled.

[0009] As shown in drawing 5, even if it has connected electrically the electrical circuit 6 of a printed circuit board 1, and the flow pattern 7 for aging and the V cut

slot 8 is formed, a flow is not intercepted and \*\*\*\*, adjustment, etc. are possible for this through hole 5 that may form the criteria section 2 for alignment using the wall of a through hole 5 with aging.

[0010]

[Effect of the Invention] As explained above, this design performs alignment using the alignment criteria section which lost the location hole which was conventionally required for the alignment of a printed circuit board, instead formed notching in the edge of a printed circuit board, and the miniaturization of a printed circuit board of it is attained, and it can also press down cost.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The top view of the printed circuit board of this invention example

[Drawing 2] The explanatory view of the alignment criteria section of drawing 1

[Drawing 3] The top view of the printed circuit board of other examples of this invention

[Drawing 4] The important section enlarged drawing of the printed circuit board of this invention

[Drawing 5] Approach drawing of the alignment of the conventional printed circuit board

[Description of Notations]

- 1 Printed Circuit Board
- 2 Criteria Section for Alignment
- 3 Guide Pin
- 5 Through Hole
- 6 Printed Circuit
- 7 Pattern for Aging

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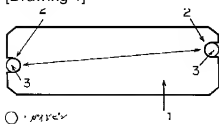
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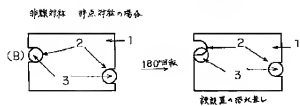
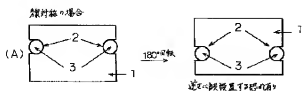
DRAWINGS

[Drawing 1]

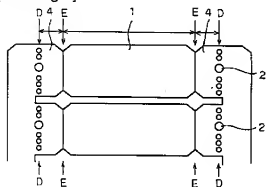


[Drawing 2]

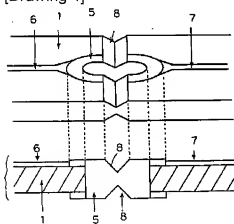




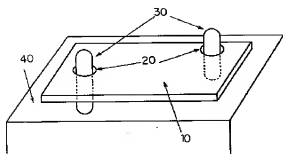
[Drawing 3]



[Drawing 4]



[Drawing 5]



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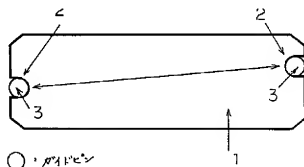
(21) 出願番号	特願平8-133006	(71) 出願人	000156950 関西日本電気株式会社 滋賀県大津市晴嵐2丁目9番1号
(22) 出願日	平成8年(1996)5月28日	(72) 発明者	田名瀬 良一 滋賀県大津市晴嵐2丁目9番1号 関西日本電気株式会社内

## (54) 【発明の名称】 プリント回路基板

## (57) 【要約】

【課題】 プリント回路基板の電検及び調整をする場合、正確な位置合わせを行う必要があり、この位置合わせ基準穴をプリント回路基板に設けると大きなデッドスペースを生みだし、プリント回路基板の小型化の妨げになっていた。

【解決手段】 切り欠きを形成した位置合わせ用基準部2をプリント回路基板1の端面部分に形成し、電検時及び調整時に治具側のガイドピン3をこの位置合わせ用基準部2にはめ込み、プリント回路基板1の位置合わせを行う。これにより、プリント回路基板1の小型化が可能になる。



**【特許請求の範囲】**

【請求項1】絶縁基板の周辺部端面に切り欠きを形成し、この切り欠きに位置決め用ガイドピンを装着自在にして電気特性検査と調整のための位置合わせ基準部としたプリント回路基板。

【請求項2】前記絶縁基板が主要部と副部からなり、前記位置合わせ基準部が主要部から分離可能な副部に形成されていることを特徴とする請求項1記載のプリント回路基板。

【請求項3】前記主要部上の電気回路と前記副部上のエーシング用導通パターンとを電気的に接続するスルーホールを前記主要部と前記副部の間に設け、エーシング終了後にこのスルーホールで分割し、位置合わせ基準部としたプリント回路基板。

**【発明の詳細な説明】****【0001】**

【発明の属する技術分野】本発明は、プリント回路基板を電気特性検査（以下電検という）、調整時に正確に位置合わせするための技術に関する。

**【0002】**

【従来の技術】プリント回路基板に電子部品を搭載して電気回路を形成する場合には、電気回路の品質管理及び電気的特性確保のために、製造工程中において電検及び調整がなされている。このため、外部からプリント回路基板上の電気回路の測定箇所（テスト端子）を正確に接触させることが必要である。一般的にはプリント回路基板は自動化ラインで電検が行われるが、ここではライン上を流れてくるプリント回路基板を電検用装置に自動位置決めして、基板の上方ないし下方からテスト端子を下降または上昇させてテスト端子を所定のテストパッド又は部品の所定位置に接触させることになる。

【0003】テスト端子を基板の特定箇所に接触させるために、従来は基板の端面（直線部分）を利用してプリント回路基板の位置合わせを行う場合、一般的にVカットの凹部面を利用することになるが、Vカット溝の位置のずれとバリの発生により、 $\pm 0.2\text{ mm}$ 程度の誤差が避けられない。したがって正確な位置合わせを行うことは難しかった。また、より正確な位置合わせが必要な場合には、図6に示すように、円形の基準穴20をプリント回路基板10に設け、治具側のガイドピン30をその基準穴20に通すことによりプリント回路基板10の位置合わせを行うという方法がこれまでとられてきた。

**【0004】**

【発明が解決しようとする課題】しかし、液晶バックライト点灯用のインバータなどにおいては、プリント回路基板は可能な限りの小型化が要求され、高密度実装と部品の小型化のために従来にも増して正確な位置合わせが要求されるようになっている。しかし、電検の際に使う基板の位置合わせ基準穴を高密度実装されたプリント回路基板の中に形成することは不可能であるし、また、

この基準穴をプリント回路基板の端部近くに形成すると基板端面側の機械的強度が低下し、その部分が欠落するという問題が起り、これを避けるためにはプリント回路基板の端部から十分の距離を保つ必要があり、基板の小型化を妨げる要因となっていた。このような状況に鑑み、本発明は電検及び調整時にプリント回路基板の位置合わせを正確に行えるプリント回路基板を提供することにある。

**【0005】**

【課題を解決するための手段】上記課題を解決するために本発明は、絶縁基板の周辺部端面に切り欠きを形成し、この切り欠きに位置決め用ガイドピンを装着自在にして電気特性検査と調整のための位置合わせ基準部としたプリント回路基板を提供する。また、前記絶縁基板が主要部と副部からなり、前記位置合わせ基準部が主要部から分離可能な副部に形成されているプリント回路基板を提供する。また、前記主要部上の電気回路と前記副部上のエーシング用導通パターンとを電気的に接続するスルーホールを前記主要部と前記副部の間に設け、エーシング終了後にこのスルーホールで分割し、位置合わせ基準部としたプリント回路基板を提供する。

**【0006】**

【発明の実施の形態】以下、本発明について図面を参照して説明する。図1は、本発明のプリント回路基板1であり、このプリント回路基板1の長手方向の端部に位置合わせ用基準部2を有し、電検及び調整時にはこの位置合わせ基準部2に位置合わせ用ガイドピン3を挿入してプリント回路基板の位置合わせを行なう。この位置合わせ用基準部2はプリント回路基板1に2箇所以上必要である。位置合わせ精度を高めるため、位置合わせ用基準部はなるべくお互いの距離が離れる様に配置するのが良い。

【0007】また、電検及び調整時のプリント回路基板1が図2(a)に示すように誤って設置されるのを防ぐために、図2(b)に示すようにプリント回路基板1全体の形状が位置合わせ基準部2に対して点対称、線対称にならないようにする。位置合わせガイドピン3の直径は、細い程プリント回路基板1のデッドスペースが減少しプリント回路基板を小型化できるが、ガイドピン3の耐久性の問題もあるため、素材が鉄の場合で直径1.7 mm以上が必要である。

【0008】図3は、位置合わせ用基準部2がプリント回路基板1本体から切り離し可能である位置合わせ基準部4を持つ構造のプリント回路基板である。電検及び調整時はD-D線上のミシン目の分割部で切断し、プリント回路基板のD-D線上の位置合わせ用基準部2を利用してプリント回路基板1の位置合わせを行ない、電検及び調整終了後はE-E線上のVカット溝の分割部を切断してプリント回路基板1を形成する。このプリント回路基板1が製品となる。製品化されたプリント回路基板1に

はデッドスペースが含まれず小型化の要求を満たすことができる。

【0009】図5に示すように、位置合わせ用基準部2をスルーホール5の内壁を利用して形成しても良い、このスルーホール5はプリント回路基板1の電気回路6とエージング用の導通パターン7とを電気的に接続しており、Vカット溝8が形成されても導通が遮断されることがなくエージングとともに電検及び調整等が可能である。

【0010】

【発明の効果】以上説明したように、本考案は、従来プリント基板の位置合わせに必要であった基準穴を無くし、そのかわりにプリント回路基板の端部に切り欠きを形成した位置合わせ基準部を利用して位置合わせを行うもので、プリント回路基板の小型化が可能となり、コストも押さえることができる。

#### 【図面の簡単な説明】

【図1】 本発明実施例のプリント回路基板の平面図

【図2】 図1の位置合わせ基準部の説明図

【図3】 本発明の他の実施例のプリント回路基板の平面図

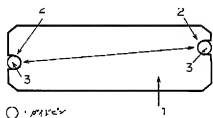
【図4】 本発明のプリント回路基板の要部拡大図

【図5】 従来のプリント回路基板の位置合わせの方法図

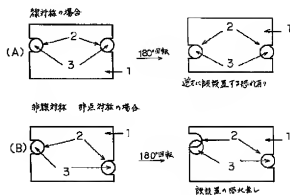
#### 【符号の説明】

- 1 プリント回路基板
- 2 位置合わせ用基準部
- 3 ガイドピン
- 5 スルーホール
- 6 プリント回路
- 7 エージング用パターン

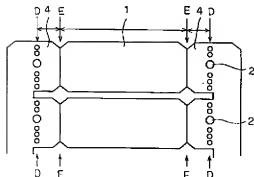
【図1】



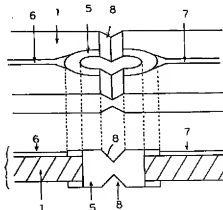
【図2】



【図3】



【図4】



【図5】

